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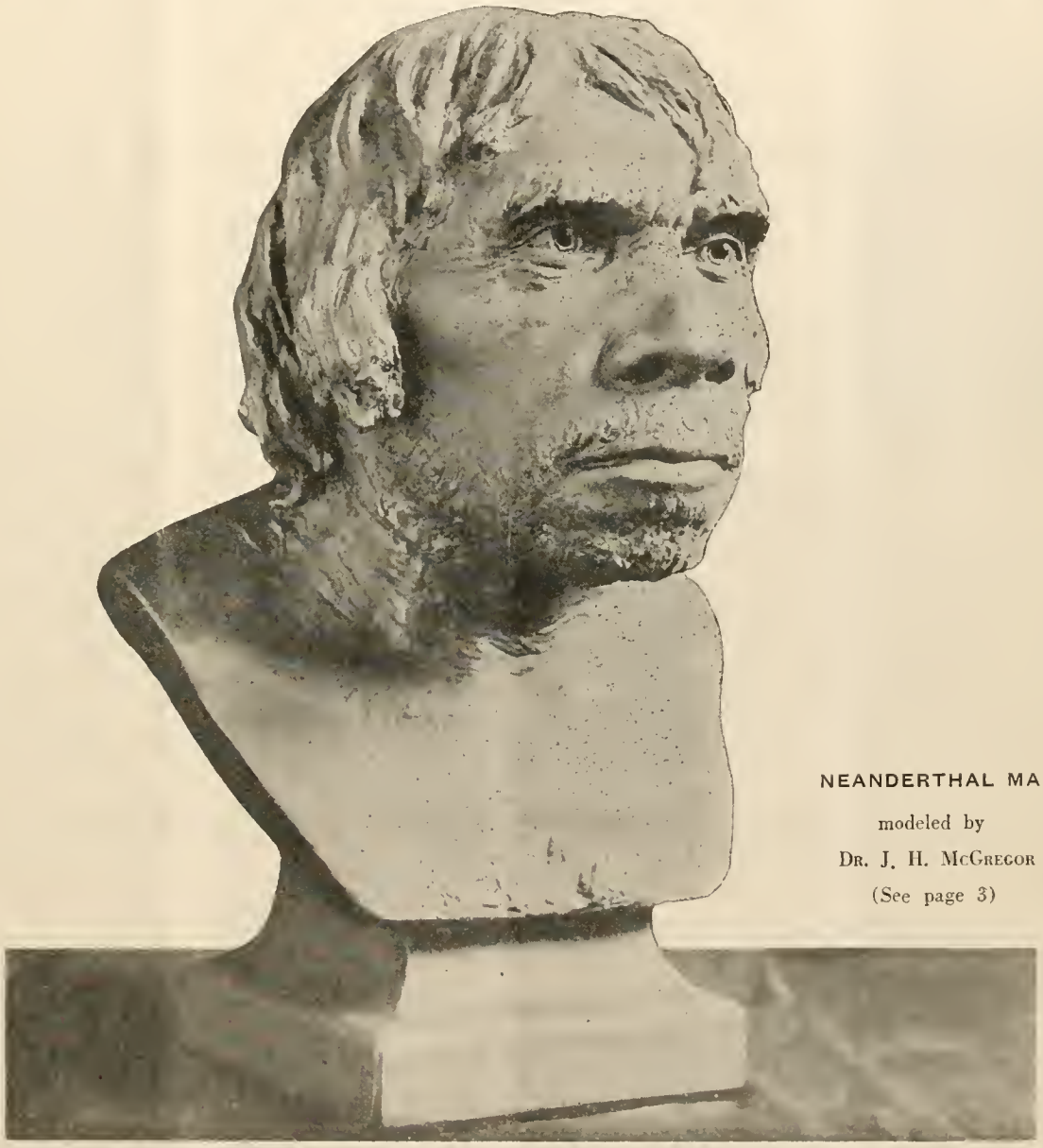


NEANDERTHAL MAN
modeled by
DR. J. H. MCGREGOR
(See page 3)

Beginning —

THE PROOFS OF EVOLUTION

By Henshaw Ward

The Proofs of Evolution

By Henshaw Ward

(An outline of the proofs of evolution will be presented in three articles, of which this is the first. The second article, "What the Rocks and Geography Prove," will appear in October; the third article, "What Structures and Embryos and Blood Prove," will appear in November.)

I. The Specialists Are Unanimous

WHEN Darwin had worked for more than twenty years on his theory of evolution, he submitted the evidence to three skeptical men in whom he had the most confidence: the keenest anatomist, the most observant geologist, and the most hard-boiled botanist in the world. They examined the evidence critically: each decided that Darwin might be wrong, but might be right. Even if they could have got together as a committee and could have devoted their time for a year to threshing out the evidence, they would not have been wise enough to announce a final verdict, of Proved or Not Proved.

Henshaw Ward

No man was ever wise enough to judge a theory by merely using his own mind on the evidence. The most acute mind has to wait to see what flaws other men will find. Since scientists are all eager for fame, it is certain that some of them will detect every weakness. As the years go by, the judgment of specialists will crystallize: if the great majority of them vote no, the theory will probably die; if all specialists finally vote yes, the theory becomes a part of our common culture and is taught in the colleges. Every theory has to run the same merciless gauntlet.

A good parallel to evolution is the astounding theory that the earth moves around the sun. This is the weirdest and most incredible idea that ever had to endure the whipping and clubbing of the learned world. For we can *see* the sun moving around us, and no eye will ever behold directly the proof that we move around the sun. During twenty centuries the theory of the earth's motion was considered a comical guess. But it was gaining favor in 1600, and had a majority vote by 1700. So much new evidence for it came through lenses that the astronomers had accepted it unanimously by 1800.

But of course many learned men in other lines remained doubtful for a time. So late as 1850 there were college professors in the United States who would have preferred that this humiliating and atheistical theory of a revolving earth should not be taught to their students. So late as 1880 a colored orator of Richmond, Uncle Jasper, was famous for his address, which he delivered hundreds of times, "The Sun Do Move." Leading white men of Richmond testified to the mental ability and high character of Uncle Jasper, though they found it hard to forgive his speechifying in favor of an antiquated bit of theology.

In 1860 the evolution theory seemed to most scholars as comical as the theory of the earth's motion had once seemed. They wrote thousands of articles and books against it. In 1870 the ordinary educated man could not tell whether evolution was going to live or die. In 1880 he had to be dubious. By 1890 most of the leading biologists and geologists had accepted evolution, and it was entered in encyclopedias as a well-established part of science. By 1920 no reputable biologist could be found who doubted evolution. People who orate against it in 1928 are just like Uncle Jasper—well-meaning men who think by the standards of a past generation.

The Uncle Jaspers of 1928 do not understand what "a unanimous vote of specialists" means. They suppose that scientific knowledge can still be debated by hashing up ancient ignorance and spouting it eloquently. They are not afraid to argue against atoms or disease-germs or radio—against any part of science that is unanimously accepted by the only men who know. An Uncle Jasper thinks that his own powerful mind is able, by itself, to judge scientific evidence and decide pro or con.

But the wisest man in the world cannot tell, from mere reading of books, whether the earth does move or microbes do cause scarlet fever. The evidence is highly technical and complicated; the best expert might be misled in its mazes. All that you and I can do is to see a simple outline of the evidence and then resolve not to be Uncle Jaspers holding out against a unanimous decision of the specialists who devote their lives to study of the question.

So I have put this proof—the biggest and most important—at the beginning. It is the one that must be our guide through the other proofs. No one of the proofs that follow is convincing in itself. Each is just a section of the whole mass of evidence. And the whole mass would not be convincing if it were not for this great fact: The combined proofs have been unanimously accepted by specialists.

II. What Breeding Proves

Evolution means to some people that "man is descended from monkeys," but in science it means that all forms of life have developed from simple ancestors. Darwin's studies began with the changes in plants and animals; his conclusions about man came at the end of his reasoning. These articles will follow Darwin's course and will begin with an experiment in plant-breeding.

For fourteen years the Inter-Continental Rubber Company has employed specialists to domesticate a rubber-bearing shrub that grows in Mexico and Texas, "guayule" (gwi-u-lay).* Great issues depend upon this breeding.

* See the admirable article by D. T. McDougall in the *Scientific American* for July, 1928.

For America needs 66% of the world's rubber, but controls only 2½% of the rubber plantations; so keen and desperate is the rivalry for rubber that it may become one of the causes of a great war; to produce rubber is now a national necessity. So we may be sure that the hard-headed managers of a great corporation and the hard-headed Dr. MacCallum whom they employ are not working by any empty theory. They are not guided by feelings about philosophy or theology. They are strenuously trying to get hold of more rubber by methods that are most likely to secure results.

Dr. MacCallum's method is the basic principle of evolution, and the steps of his work illustrate one line of proof of that theory. He believes in evolution as thoroughly as a cotton-grower believes in rain; and he knows that an enemy of evolution is an enemy of industry and civilization and horse sense.

In the first place, he knows—as every farmer knows—that a young rubber plant will be very much like its parents. It will inherit all their traits of forming roots and leaves and filling its tissues with a rubber that can be made into Ford tires. This is the principle of "heredity." It is no more theoretical than a rubber tire. Offspring tend to resemble their parents.

But Dr. MacCallum also knows that no young plant ever resembles its parents completely. It may have been a trifle speedier in sprouting from its seed; it may be slightly more able to withstand drought; it may be somewhat more able to endure a cold summer; its fibers may contain a higher percentage of rubber. Every plant and animal varies to some extent from being an exact duplicate of its parents. This is the principle of "variation." It is no more a theory than a steering-gear is.

For fourteen years Dr. MacCallum has been busy selecting those shrubs that have varied in ways which will make them more profitable as domesticated plants. First he selected from a bewildering lot of wild varieties the few that were most promising. Then from the offspring of these he selected the variations that tended to sprout and develop at the times that are best fitted for Texas and California farming. Of course he discarded all rubber plants that were varying in the direction of producing less rubber. By saving the right variations and discarding the wrong ones he was gradually producing the sort of plant that can furnish automobile tires. For the selected variations are preserved and transmitted by heredity to succeeding generations. This is the principle of "selection." It is no more theoretical than the price you will have to pay for an inner tube if the United States cannot grow its own rubber.

All breeders of plants and animals have known for centuries this method of selecting favorable variations and building up what is useful to man. It is the process which has given us the valuable varieties of wheat, corn, roses, cattle, horses, and fowls. There is not a farmer in the United States who thinks that this process of breeding by selection is untrue. Every farmer knows that selection is the foundation of modern agriculture.

Darwin wondered whether there might not be in nature a process similar to this artificial one. He knew that some variations must help a plant or animal to do better in the struggle for existence, and that some variations must be unfavorable and cause it to die. "May it not be," he wondered, "that the conditions of life are always killing off unfavorable variations and allowing only the favorable ones to multiply?" If this was the case, then the forces of nature would always be tending to preserve variations in certain directions and to kill them off in other directions. If nature had operated thus over very long periods of time—millions of years—it might gradually have caused an animal to become vastly different from its remote ancestors. Perhaps all the millions of varieties of plants and animals had been produced by this sort of evolution.

Darwin did not fall in love with his new theory just because it looked pretty. Nor would scientists ever have accepted it just because it seemed probable. Evolution would have remained a mere guess if no other kinds of evidence had been discovered. The other kinds will be described in the next two articles.

McGregor Reconstructs Ancient Man

By Allan Strong Broms

In the Hall of the Age Man in the American Museum of Natural History are several busts of prehistoric races of man. They have been modeled by Dr. J. H. McGregor, Professor of Zoology at Columbia University and Research Associate in Human Anatomy at the Museum. This means that they are the best racial portraits our present knowledge permits, for Dr. McGregor is a careful and skilled sculptor-anatomist and devoted a good part of five years to the making of these likenesses of the ancient races of mankind. This was no mere work of artistic imagination, but a task of scientific accuracy done by the man who has made himself the world's foremost authority in his field.

Our cover this month shows his reconstruction of Neanderthal man, whose race lived in Europe some twenty-five to seventy-five thousand years ago. He told the story of its making. For a start, he had plaster casts of many fragments, several fine jaws and seven fossil skulls upon which to base it. The skull of La Chapelle-aux-Saints, France, which had proved to be most complete when pieced together, was used as the base for this particular head. As the original fossils, besides all being in European museums, were much too delicate and valuable, plaster casts were used throughout the work.

The first job was to restore the missing teeth and nasal bones by comparing similar parts from kindred remains, making them over, of course, to fit the parts that were intact. The hole in the skull was readily filled by using the other half as a model. On this nearly perfect cast was then modeled the fleshly form. With his other duties, this took him one whole year, so exacting was the work.

The next step was to model the neck. Its fossil bones were available as a guide and were carefully drawn full size in vertical section. The other vital parts, muscles, ligaments and organs, were then filled in as exactly as possible and upon this basis the outer form was built. The skull was then poised on this reconstructed neck in its natural position. The neck proved

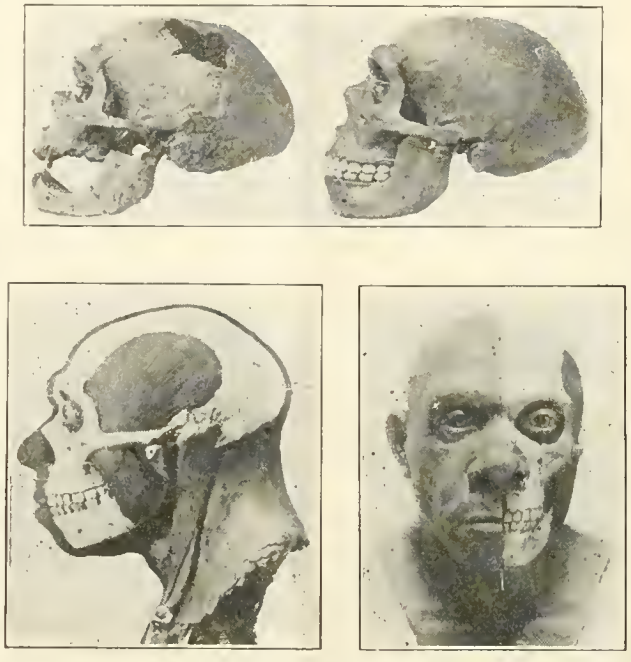
to be thick, but no such "bull" neck as had hitherto been assumed.

The larger muscles of the temple, between the jaws and alongside the neck were modeled with considerable assurance, for their points of attachment were obvious and even their sizes could be gauged closely from the skull itself. The multitude of minor muscles make a relatively smooth covering of flesh and could be modeled on in accordance with normal local thicknesses. Exhaustive preliminary studies were made to learn these thicknesses, which were first marked on photographs of the skull for reference purposes and then transferred to the skull-cast itself as little guide pins cut off at proper heights above the surface. The final flesh model was then filled in until it just covered these pins, but to make absolutely sure, the thicknesses were laboriously checked and corrected by probing through with measuring needles. All this took months of work.

The positions of the ears were obvious from the ear openings in the skull, but nothing else was definitely known. We have the best of reasons, however, to believe that they were quite normal human ears and they were so shown. The nasal openings of this and other Neanderthal skulls indicate a wide nose, but just how wide we cannot be sure, and the nasal bones a prominent one, not flat at all, as others had believed.

He studied the eyes most carefully. The skull had very large eye sockets, but he found that human eyeballs were fairly uniform in size, however big the sockets might be. He also found that normal eyes are placed just a little above and outside the centers of their sockets, but that they varied nearly half an inch in their prominence. He adopted the average position. But, of course, that did not fill the socket, so he worked in tear glands, muscles and eye lids to fit and thus built up the eye as it probably appeared.

All this done, he made three plaster casts for permanent records. The first was just plain and bald-headed, suitable for scientific study of the head shape. The second was also for scientific use, the right half being clothed in flesh, as it were, and the left half having this covering removed to reveal the underlying groundwork of skull, eyes, nose and major muscles. But for the general public it had to be made presentable, so hair was added, a suggestion of beard and some human wrinkles. He finally touched up the eyes a bit and stood face to face with the adult male of the extinct Homo neanderthalensis. (See front cover).



Three stages in modeling Neanderthal head: 1. Original skull pieced together; 2. Skull cast, missing parts restored; 3, 4. Side and front view of half and half model, basic modeling on left, outer face modeling on right side.

Courtesy J. H. McGregor.

But there is a whole row of these reconstructions. That row demanded three trips to Europe to examine the originals and make suitable casts and five years of exacting scientific labor. It consists of (1) the ape-man of Java, Pithecanthropus erectus, of whom there are but scanty remains and therefore more guesswork; (2) the Piltdown man, Eoanthropus dawsoni, whose skull and jaw were fairly complete; (3) Homo Neanderthalensis, whom we have watched him reconstruct; and (4) the noble-looking Cro-Magnon man, quite modern in aspect, whose reconstruction from the excellent fossil remains Dr. McGregor found too easy to be interesting. I am much afraid, however, that his "easy" misleads, for even this last demanded such scientific care and months of painstaking work that most of us would call it a "big job".

Busts of four races of Ancient Man, modeled by Dr. McGregor. 1. Ape-man of Java; 2. Piltdown Man; 3. Neanderthal Man; 4. Cro-Magnon Man. They represent *various branches, rather than a* single ancestral series, of the human family.

This is the first of a series of articles by various authors on "Scientists at Work", to give the layman some idea of the painstaking labors on which modern scientific conclusions are based.

The Animals of the Past

By Frederick A. Lucas, *Honorary Director, American Museum of Natural History*

THE object of these articles is to tell some of the interesting facts about the better known and more remarkable of the extinct inhabitants of the ancient world and to ease the strain on these venerable creatures caused by stretching them so often beyond their due proportions.

The author expects to be taken to task for the use of scientific names, but people who call for easier names should reflect that such names are no harder than others, simply less familiar, and when domesticated, cease to be hard; witness mammoth, elephant, rhinoceros, giraffe and boa constrictor. Again, one just must use the scientific names for the periods in which these animals lived—Jurassic, Eocene, Pliocene—because there is no other way to do it.

Dr. Frederick A. Lucas
Courtesy S. Ichikawa

The restorations of extinct animals are according to our best knowledge and may be considered as accurate as it is possible to make them. The cuts are largely from the rich collection of the American Museum of Natural History which contains more complete specimens of fossil vertebrates than does any other.

I. How Fossils Are Formed

Fossils are the remains or indications of animals or plants that have, through natural agencies, been buried in the earth and preserved for long periods of time. It is not essential that the organic matter be replaced by some mineral to be classed as a fossil, for the Siberian Mammoths, found entombed in ice, are very properly called fossils, although the flesh of one was so fresh that it was eaten. Many fossils, however, merit the name "petrifications" because they have changed into stone by the slow removal of the organic matter and its replacement by some mineral, usually silica or lime. It is also necessary to include "indications of animals and plants" in our definition because we sometimes learn most from mere impressions, such as those of leaves, made in soft mud or smooth sand which later hardened into enduring stone. Such, too, are ripple marks and imprints by raindrops, the trails of creeping and crawling things, casts of worm burrows, footprints of reptiles. Fine mud, now become rock rivalling porcelain in texture, may bear the imprint of a bird's feathers, of a reptile's skin, of each fin ray and every thread-like bone of a fish, or perhaps such soft, delicate objects as jelly fishes. Without some of these, we might have little positive knowledge of the outward appearance of many animals of the past.

The reader may wonder why fossils are not more abundant; why not a trace remains of the vast majority of the animals that have lived upon the earth. The answer is that, unless conditions were such as to preserve at least the hard parts from immediate decay, there was small possibility of an animal being fossilized. The object must be protected from the air and practically the only way this happens in nature is by being covered with water or buried in wet ground. If a bone lies exposed to sun and rain, frost and snow, these destructive agencies soon reduce it to powder. Even in a dry climate, mere changes in temperature, by producing expansion and contraction, soon cause a bone to crack and crumble. Carnivorous animals, such as our dogs or hyenas, are great bone destroyers, as are rats, mice and other small rodents that attack bones for the grease they contain or just to exercise their teeth. Plant rootlets also enter the bone fissures, expand as they grow and thus act as little wedges to force it asunder.

If the body sinks to the muddy bottom of a lake or is caught in the sandy shoals of a river, the chances are good that its bones will be preserved. The chances

Tracks of Dinosaur feet and dragging tail across ripple marked sand, turned to stone.
Courtesy Am. Museum Nat. Hist.

are poorer in the ocean, for the waves pound them to pieces with stones or scour them away with sand, while marine worms and starfishes pierce and cut them. There are more enemies of a bone than one would imagine. But in a quiet lake, the fine mud settles gently as dew on grass. Little by little the bones are covered by a deposit that fills and preserves each groove and pore, and eventually buries them as deep as you please. Engulfment in quicksand is perhaps the best way of all, for the body is then supported without crushing. At least two examples of the dinosaur Trachodon have been found with the bones all in place, the thigh bones in their sockets and the ossified tendons running along the backbone as they did in life.

If the land gradually sinks—the earth crust is ever rising and falling—the mud and sand can accumulate until an enormously thick layer is formed. The lime or silica contained in the water would tend to cement the particles into a solid mass, aided by the pressure of the overlying sediments and by the heat resulting from that pressure and derived from the earth beneath. Meanwhile the animal matter will disappear and be replaced by lime or silica, thus forming a layer of rock containing fossils. The very rocks themselves may consist largely of fossils, chalk, for example, being mostly the disintegrated shells of simple marine animals called foraminifers.

Even after an object has been fossilized, it is far from certain that it will remain in good condition until found, while the chance of being found is exceedingly small. Only here and there has nature made the contents of the rocks accessible by turning the strata on edge, heaving them up into cliffs or furrowing them into valleys. A vast number of the pages of the fossil record must ever remain unread. The wonder is that we have learned so much, for nature is careless in keeping the records—preserving only scattered fragments and then subjecting them to many accidents. Some get badly flattened by the weight of subsequently deposited strata, others are cracked and twisted by movements of upheaval or subsidence, and if at last they are brought to the surface, the same sun and rain, frost and snow, from which they once escaped, are ready to renew the attack and crumble even the hard stone to dust. That, briefly, is why fossils are not more plentiful, why we have mere hints of the existence of many animals and why myriads of creatures may have flourished and passed away without leaving behind so much as a trace of their presence.

Brains—How Come?

By ALLAN STRONG BROMS

MAN heads the class in brain power because he got the lucky breaks. That pre-monkey ancestor who took to the trees did him a couple of good turns. For one thing, he developed the skilful hands to help man's brain do its stuff. We have already discussed that. Also, his tree life made his eyes over into the best of all guides by giving them a new power. That was a second big boost. But that is really the end of this story and we must begin at its beginning.

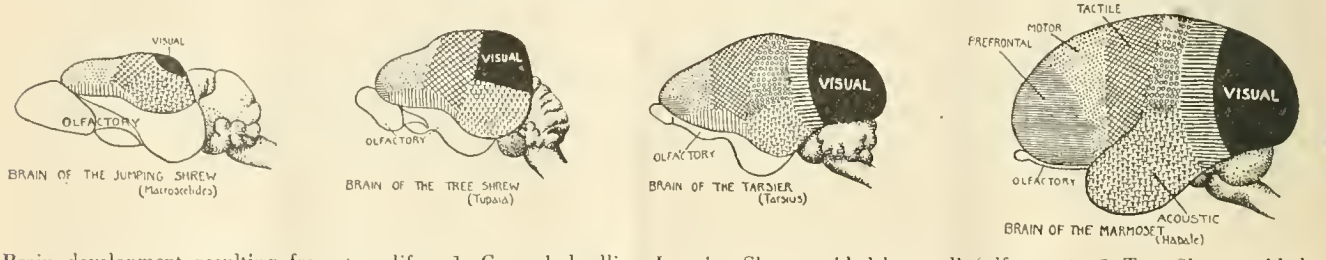
Man's earlier ancestors smelled their way through life. Some had sharp eyes, but for learning the really vital things they used their noses. Smell, and its kindred sense taste, told all that was important about food. Smell distinguished friends from enemies, sexual mates from sexual rivals. Food or poison? Friend or enemy? Mate or rival? Those are vital problems of animal life. And the animal nose knows.

But smell tells nothing of direction, form and several other details. The eyes do that. The warning sniff of danger that brings a deer up alert probably comes down the wind, but the deer never can tell for sure until it sees. Nor does it know whether the enemy scent means a harmless passer-by or a stalking hunter, until it sees. "Safety first" might seem to dictate, "Beat it while the beating is good," but the question, "Which way?" makes it best to "stop, look and listen." One look tells which way, the definite guiding fact to which can be fitted a definite, and therefore effective, course of action.

Exact and detailed knowledge comes, not through the nose, but through the eyes. And real animal intelligence arose only when the eyes supplanted the nose as the main gateway to the thinking brain. For millions of years, however, smell held sight down, for it happened that there was not room enough in the brain for both, nor on the face either. To understand this, we must take a look at the brain.

For present purposes, the brain of a back-boned animal may be divided into front-brain (top brain in monkeys and man) and rear-brain, the latter in several sections. The special job of the front-brain is gathering new information and thinking about it. The rear-brain handles nothing but old automatic routine. The front-brain *associates*, which is just high-brow for putting two and two together. It compares and chooses,—courses of action, for instance. It considers new problems, decides what to do about them and then orders the muscles to do the work.

The rear-brain does not think; it just acts, and always in the old, routine ways. But if circumstances change,



Brain development resulting from tree life. 1. Ground dwelling Jumping Shrew guided by smell (olfactory); 2. Tree Shrew guided more by vision, less by smell; 3. Pre-monkey Tarsius, sees one object with both eyes, but not stereoscopically; 4. Marmoset, our lowest monkey, sees stereoscopically, its large perfrontel area controlling eye convergence and muscular accord.

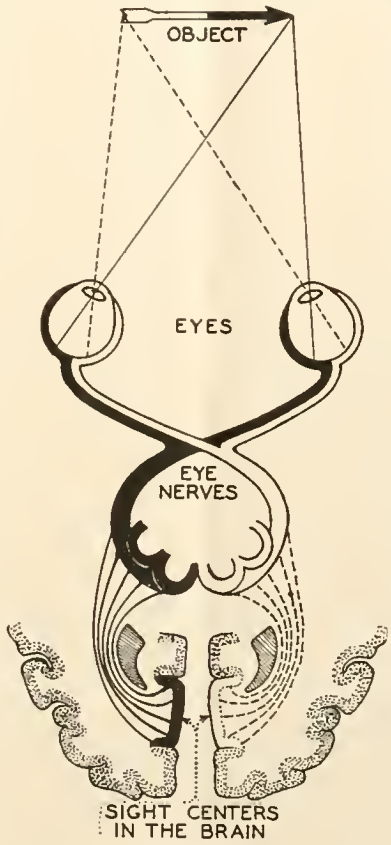
From G. Elliot Smith.

the old ways may be all wrong. Then new ways must be thought out. That is the front-brain's job. It can do the job well only if it gets exact facts to work on. As the eye gets better facts than the nose, the thinking front-brain never could amount to much until it used eye-facts instead of nose-facts. It just had to quit being led around by the nose.

So it was really tough luck that the eye nerves of the lower animals always got the wrong connections. In the fishes and frogs, they connected with the rear-brain which could not think, and in the reptiles and birds with a part of the front-brain that was cramped and could not grow. But at last, in the mammals, they plugged in on the right switchboard and then things began to happen. For good connections do count,—especially in evolving brains.

Before this, the nose nerves always had the best connections and dominated front-brain thinking—what little there was of it. There could not be much, for the nose was a poor provider of exact facts. But though the nose-facts were not exact, they were really very important, —about the things one could smell—food, friends and foes, mates and rivals. At first, there was a good reason for the nose getting and keeping the best brain connections. The eyes just had to wait for their big chance.

There was a second reason. The eyes were not yet good enough. Eyes, to help much, must be really good, and the first ones were pretty crude. They probably only distinguished light from darkness, movement from stillness, without telling anything about color, shape and distance. To develop them took time. So the nose got there first and took over the front-brain job, with the eyes as mere helpers.



Mechanism of stereoscopic vision. By branching and crossing of eye-nerves, each half of brain sees through corresponding halves of both eyes.

Drawing after J. R. Angell.

In the reptiles and birds, the eyes got a first, slim chance. In helping out the smell sense with stray bits of exact knowledge (which worked into the front-brain associations), the eye nerves got a foothold in the front-brain. But unluckily they got into a crowded spot, underneath and inside where real growth was impossible. So nothing much came of it until one of the reptiles evolved into a mammal.

Among the mammal improvements was the connecting of the eye-nerves with the roomy outside of the front-brain. That helped a lot. The eye-facts, because they were more exact and useful in thinking, gradually displaced the nose-facts as rulers over the front-brain. New associations, dominated by sight sensations, were acquired, and the front-brain grew a lot of new nerve connections in its complicated switchboard. Of course, the new sight-center grew. But so did other centers too, of muscle control, of touch, of association, because clear seeing helped them do their jobs. Only the smell centers (olfactory lobes, etc.) dwindled. In man they have completely lost their dominating importance. Today we are predominantly eye-minded.

In the very highest mammals an additional eye-power developed,—stereoscopic vision,—seeing an object as a solid by viewing it with both eyes at once. It works like the old-time stereoscope that made two flat pictures stand out as solid objects. In most animals, the eyes work separately and can watch on both sides. In man and his recent ancestors, the two eyes look at the one object, converging (sort of cross-eyed) to do it. The closer the object, the more they converge. Our feeling of the convergence then tells us the distance. Try it. Close one eye and try to thread a needle. Open it again and note how it brings out distance. Your tree climbing ancestor, swinging and leaping from branch to branch, had to know his distances, for a miss was as bad as a mile. He needed a quick and accurate range-finder, and the new eye-power was just that.

To do this stereoscopic trick, the eyes needed new brain connections. For one thing, they had to move accurately together and this required better accord in muscular control. But something even more fundamental had to change. Before this, each hemisphere (side half) of the brain connected with just one eye and the two images entering through the two eyes had no common brain center in which to blend into one image. With the new eye-power, each hemisphere connects with the corresponding halves of *both eyes*. Each half of the brain therefore sees through both eyes, and the two images merge and become one to the mind. That one image now has, besides height and width, also depth (distance). It appears in three dimensions, looks solid and stands out. You can distinguish substance from shadow. That helps skilful handling and clear thinking.

Also some changes had to be made outside on the face. The eyes had to be right out front where they could both see the one object at one time. That meant that the big snout for smelling had to go, for it interfered with the view. To your tree-dwelling ancestor this loss did not matter, for he no longer tracked his prey by nosing out the smells they left along the ground, and from his high outlook he could see danger as easily as he could smell it. With eyes front and snout reduced, his face began to have the human look. Best of all, peering out through those knowing eyes was a growing mind, dominated by clear vision and muscular mastery. It took millions of years to develop, but it was worth it. For it gave man his lead on the animal world and made him the big boss on earth.

But to win man needed also touch and muscle control, hearing and sense of balance. Some of the story of how they grew up together will be told in our next.

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WE GREET THE R. P. A.

Through the kind co-operation of the Board of Directors of the Rationalist Press Association in London this issue of EVOLUTION is being sent to their entire membership throughout the world.

This may seem like "carrying coals to Newcastle," for certainly every member of this progressive organization is already an evolutionist and emancipated from religious superstition. And EVOLUTION is not published primarily for the entertainment or information of those that are convinced evolutionists. But EVOLUTION offers itself as an instrument for evolutionists to use in their work of enlightening their friends and neighbors. We hope that all English-speaking Rationalists will find it a useful weapon in their fight against intolerance and fanaticism no matter where they live.

Although bred of bigotry in the United States, the World's Christian Fundamentals Association has the avowed purpose to suppress in the entire world all teaching of science that conflicts with the Bible story of creation. Rationalists everywhere will surely gird their loins to help beat back this renewed attack of preacher upon teacher.

Two friends of intellectual freedom have made this world-wide mailing of samples of EVOLUTION possible through their generous contributions. Frank Gosling of England covers the postage costs, and A. Nielen of the United States paid for the three thousand copies. We invite others to follow their splendid example and furnish enough funds to make EVOLUTION a real power, able to cope with militant fundamentalism and help win the world for the Open Mind.

AN OVERSIGHT

The American Museum of Natural History should have been credited with the illustration "Comparative sizes of living and extinct Proboscidea" used on page6 of our August issne.

TWENTY STATES TO VOTE ON EVOLUTION

There is a tendency to look upon the Arkansas anti-evolution referendum as merely an evidence of local backwardness. Few realize that in Arkansas there is taking place the opening skirmish of a tremendous campaign that has been planned far in advance by the fundamentalist generals.

They have already announced their intention to place this question on the ballot in every one of the twenty States that have Initiative laws. That means: Arkansas, Arizona, Idaho, Maine, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, North Dakota, Ohio, Oklahoma, Oregon, South Dakota, Utah, Washington, California and Colorado.

Maynard Shipley, President of the Science League, writes: "Watch Oklahoma. If Arkansas goes anti-evolution in November, Oklahoma will be next. Straton is out there now, also Brown and others of the 'flying squadron'."

The only way to meet this fundamentalist menace is POPULAR ENLIGHTENMENT. In this EVOLUTION hopes to serve, and invites your immediate co-operation.

THEY'D CALL A SPADE A SPOON

The most preposterous pretense put forth by fundamentalists is that they favor "separation of church and state", and that they oppose evolution because it is a "religion", and they "do not want religion taught in the schools." This is like calling a spade a "spoon."

The fact is that the passing of an anti-evolution law immediately takes control of the class-room out of the hands of the teachers and puts it in the hands of the local preachers.

A fundamentalist apologist, Eugene McSweeney, writing in their official organ, says: "The Anti-evolution law is nothing more than a modern application of the ancient law of blasphemy. It merely says to the teacher, 'You shall not deny the story of God's creation in the class-room, because it alienates the students from the love of and reverence of God.'"

Exactly. And who would be the official snoopers to ferret out teachers under this "modern application of the ancient law of blasphemy"? Who but the pulpiteers? And woe unto the teacher who doesn't toe THEIR mark.

Do the folks in Arkansas really want to make their schools mere annexes to their churches? Then pass the anti-evolution law.

JUST A SUGGESTION

If the preachers are to tell the teachers what they may and may not teach regarding natural science, shouldn't they be required to have at least a little bit of scientific training? Is it fair to force the teacher to pass a stiff examination before being allowed to teach science, and require nothing of the preacher? Why shouldn't the parson have to pass similar examination under the Department of Education, or else keep his mouth shut?

PARSON VS. PEDAGOG

The clergy have always claimed the right to control education. The schoolmasters have always resisted the claim. There is an irreconcilable difference, a three hundreds years' war that may well keep going three hundred years more, that most probably will keep going in some form so long as both parsons and pedagogs remain on the earth.

For the ideals of pedagog and parson must always, of necessity, be in conflict. The teacher's duty is to make his pupils think; and to this end he acquaints them with just as wide a range of ideas and principles and facts and theories and points of view as, in his professional judgment, they are capable of utilizing at each stage in their development. With their opinions he has no concern. His duty is done when his pupils understand the nature of each possible opinion and the reasons for accepting or rejecting it.

Not so the clergyman. His professional duty is to make his parishoners believe; and to this end, quite rightly, he strives to limit their range of ideas, principles, facts, theories, and points of view; for he knows, again correctly, that belief results from narrowing the mind, not from expanding it. Unlike the teacher, he is responsible for people's opinions, and he takes an obvious method of controlling them. So the man who wants people to think, and the man who wants to keep people from thinking, have to fight out or compromise a difference that they cannot adjust.—From address of Edwin Tenney Brewster before Rationalist Society of Boston published in The Truthseeker.

STORY BY McKECHNIE

In our next issue will begin an entrancing story by H. N. McKechnie, author of "Heir of All the Ages," entitled "Twigs from the Family Tree," and explaining in fiction form how our ancestors may have branched off from those of the apes.

UNDERMINING OUR EDUCATIONAL SYSTEM

By OSCAR O. WHITENACK

(Extracts fram leaflet issued by Colorado Rationalist Association)

EXAMINATION of a few fundamentalist propositions will show the quality of their teaching and its effect on our educational system.

They say: "There is not a shred of evidence for evolution." But Sir Arthur Keith, standing before the British Association for the Advancement of Science last year, declared: "The evidence of man's evolution from an ape-like being, obtained from the study of fossilized remains, is definite and irrefutable." And no ta scientist in his audience nor in all Europe and America QUESTIONED THAT STATEMENT.

They say: "Man has existed but a few thousand years. He could not have lived through the ice-age of ten thousand years

go." Every anthropologist, every encyclopedia and our textbooks all assert that man has been on earth not less than 500,000 years and the evidence that he did live through MORE THAN ONE ICE-AGE IS IRREFUTABLE. See "Men of the Old Stone Age," by Osborn.)

"The Old Stone Age, the New Stone Age and the Age of Metals were not successive but contemporaneous." This contradicts every authority in anthropology and simply ignores the evidence of the remains of primitive man. (See Dr. McCurdy's "Human Origins.")

"The Flood of Noah is historical. There is a flood story in the traditions of every people." Both statements are false and any man in the twentieth century who thinks that Noah's Flood is historical ought to be ashamed of himself. The Encyclopedia Biblica, the standard authority of the Church, declares that the Deluge story is but a myth. All other encyclopedias agree. The history of Egypt begins 4241 B. C. and her traditions go thousands of years back of that date and there is no mention of a Deluge. (History of the Warfare of Science with Theology, by White.)

"The tremendous catastrophe (The Deluge) accounts for all the sedimentary strata which we find all over the earth, and is the cause of practically all the great mountain systems of the world. Waves rushed around the earth every twenty-four hours at a rate of more than a thousand miles per hour, and they must have been six miles high." Can anyone imagine stratified rock a mile thick laid down in the first six months of the Flood and the Grand Canon of the Colorado being cut in the next six months? Imagine the Alps, the Andes and the Rockies being formed in the one year of the Deluge? Imagine Noah and the menagerie in the Ark safely riding these six-mile-high waves moving at the rate of over sixteen miles per minute? IS THIS THE "SCIENCE" THEY WANT TAUGHT IN HIGH SCHOOLS INSTEAD OF GEOLOGY?

It is not my purpose to heap ridicule upon their heads. If the fundamentalist "message" is true, our leading scientists are little more than charlatans and poltroons. If they are right we should revise our courses of study, delete our libraries of all works on Geology, Anthropology, Biology, etc., etc., rewrite our histories and encyclopedias, hold in utter contempt Darwin, Osborn, Wallace, McCabe, Sir Arthur Keith, McCurdy, and thousands of others, wipe out the results of the researches of the past century, declare to the world: "Fundamentalists hold the truth, the whole truth, and nothing but the truth" and STOP ALL RESEARCH.

Indeed, SUCH A MOVE IS POSSIBLE and in Mississippi and Tennessee it is actually carried out. Children by the millions are being LEGALLY RETARDED IN THEIR MENTAL AND MORAL DEVELOPMENT—and at the instigation of religious leaders! All scientific facts that contradict the fundamentalist interpretation of Genesis are taboo. Teachers, highly trained in Science and History, must take orders from the ignorant clergy as to what they shall teach, or lose their positions. AND THE SAME CONDITIONS PREVAIL IN MANY LOCALITIES IN OTHER STATES.

But the greatest menace in the program of the Fundamentalists is their method of teaching. Not one of their preachers would open even the church basement to Maynard Shipley, David Starr Jordan, Joseph McCabe or to Sir Arthur Keith. In denying a hearing to their opponents, in prohibiting by law the teaching of evolution, they ASSUME THEY HAVE A MONOPOLY OF THE TRUTH. Did not this very assumption cause the execution of Socrates, the Crucifixion of Jesus, the burning of Bruno, and the damnable humiliation of poor old Galileo? Has it not caused more suffering, more hindrance to progress, than any idea that ever cursed the human race? And will it not wreck our educational system completely wherever it is put into practice?

Frogs Without Fathers

By JOSEPH MCCABE

A COUPLE of centuries ago, when science first discovered the existence of germ cells, even the scientific imagination ran riot in speculating about them. Here was a minute bit of jelly which, given time and the proper conditions, would build up the entire and marvelous structure of a bird, a lion or a man. How? Well, the first idea was that each of these germs was a properly formed body (of a bird, lion, man, and etc.) in miniature. The tiny human ovum, less than the hundredth of an inch in diameter, was supposed to be a fully formed body, with face, heart, nerves, muscles, etc. It merely grew bigger in what we called its embryonic development. If that is so, the whole race must have been packed away, in very small miniature, in the body of Mother Eve. Indeed, one famous scientist, working on the good old theory that she trod the earth and ate apples six thousand years ago, startled his contemporaries by estimating that Eve had inside her no less than two hundred billion miniature humans. . . . It sounds funny today, but recollect, on the other hand, that for the previous five thousand years of civilization men had been totally ignorant of the very existence of germ-cells. They knew little more about one of the most wonderful phenomena in the world, the formation of a new body, than a child does.

When the microscope became more powerful, and it was seen that the body was only gradually formed, the question of the respective shares of male and female became very intriguing, especially in view of the scores of cases in which the male did not co-operate.

For the experimental embryologist animals of the star-fish and sea-urchin type are the most convenient. He easily secures a few ova, as we insist on calling them in this "vulgar age" of ours, instead of using the English word "eggs," which seems to hurt people's feelings, and bring the dark lanterns of the police upon you. These microscopic ova are then put in sea-water under a lens, and you can follow the whole wonderful story of the construction of the very elaborate body of a star-fish from the tiny speck of plasm. If there are both male and female elements in the water, you find the tadpole-like male elements wriggling about until one gets, by chance, near the ovum. Then some evacuation from the ovum, akin to smell, seems to attract it—here I am giving you a mere supposition—and at all events it moves in toward the ovum. The next step is curious. There is a jelly-like substance surrounding the ovum, and through this it sends out a sort of filament toward the male particle: for all the world as if it were fishing for it. The male, in fact, seems reluctant to be drawn in, and often the tail lashes more vigorously and it breaks away again. Normally it enters or is drawn into the ovum, and the first steps in the formation of a new organism soon follow.

Loeb and others, watching these sea-urchin elements under the microscope, noticed that if the tadpole-like male cell touched the ovum and got away again, the ovum began to change just as if it were fertilized. This gave them the idea of touching it with a needle. You want some skill to touch a little globule of jelly about the two-hundredth of an inch in diameter—that is to say, far smaller than the dot on this i—with the point of a needle, but the resources of a modern laboratory can meet more exacting requirements than that. It was done, and we found the ovum began to develop.

Meantime it was found that altering the condition of the sea-water in which the germ cells floated could bring about the same result. If the quantity of salt in the water is greatly increased, the ovum, without fertilization, begins to develop. Neither the simple prick of a needle nor the strong solution of salt will make it develop into a fully formed animal, but experiments were multiplied by the thousand until acids were discovered to bring about the desired result. The pricked ovum in a certain medium without the needle, made the male superfluous, and all kinds of animals, up to the level of the frog and the newt, came into the world sinless and fatherless. You may ask why we stop at the frog. Why not open out the prospect. . . . There is no need to run on to speculations of this nature. On reflection you will understand a very good reason why the experiment stops at the frog. It is the highest animal in the world which leaves its ova floating in the water. It is not so easy to try such experiments on land animals.

O. B. U. Bulletin.

How The War On Fundamentalism Began

By HARRY ELMER BARNES

ALMOST striking phase of cultural progress from 1500 to 1800 was the development of natural science from Copernicus to Newton and Lavoisier. This put at man's disposal a vast new knowledge of the physical universe, the nature and processes involved in the life of man, and the relationship between man and the other animals. It also emphasized the new scientific or inductive method of searching for truth as opposed to the older religious and metaphysical technique. At first this scientific approach was confined to the physical and biological sciences, but its success there made its ultimate application to man and his social relationships inevitable. By undermining the views of man resting upon the religious outlook, it encouraged the study of man simply as a human being in a secular setting. The discoveries overseas helped this scientific movement by stimulating the spirit of curiosity and by bringing information about the physical universe as observed from new angles, the flora and fauna of the world, new rocks and chemicals, geographic conditions, and, above all, the customs of man in all parts of the planet and in all stages of cultural evolution.

A group of English Rationalists were the first to utilize this new knowledge for the reconstruction of the prevailing view of the world, God, man and society. Lord Herbert of Cherbury (d. 1648) and Charles Blount (d. 1693) formulated a new, Deistic, religion based upon reason and alleged to have been found in all essential phases among all peoples at all times. This religion rested upon five fundamental tenets: (1) the existence of God; (2) the worship of God; (3) the view that the promotion of better living was the chief end of worship; (4) the contention that better living must be preceded by the repentance of sins; and (5) the belief in a world to come in which man would be dealt with in accordance with his daily life here on earth. It was justified with the assertion that it was universal, while Christianity had been defended upon the contention that it was unique.

Alexander Pope in his *Universal Prayer* (1737) developed a conception of the physical universe and of God compatible with the new astronomy and natural science. The petty God of the ancient Hebrews was manifestly not adequate to serve as ruler of the new universe revealed by the astronomers from Copernicus to Newton. God had to be magnified to create a supernatural being suitable to the new cosmic perspective. Further, the Christian notion of God had been one of arbitrariness. God, to the Christian, was functioning vividly only when leading nature to deviate from her normal course in earthquakes, volcanic eruptions, tidal waves, comets and the like. Pope and his associates were impressed with the processes revealed by natural science and came to regard God as a law-making and law-abiding God. He was especially manifest in the unending repetitions and orderly behavior of nature. Natural law was identified with divine law, God being regarded as the source of all natural manifestations.

The Third Earl of Shaftesbury made another contribution to the reconstruction of God. The Hebrew and Christian God was arbitrary, jealous, inconsistent, cruel, revengeful; as Mark Twain remarked, guilty himself of all the sins and crimes for which he punished mankind. The gentle Shaftesbury was repelled by all this. Montaigne had earlier protested against the orthodox slanders of God, holding that God had more majestic and God-like responsibilities than counting the hairs on the head of each individual daily or taking a census of the sparrows at nightfall, and that divine activities were on a divine level and of a divine character. Shaftesbury went further. He held that, while the attributes of God probably far transcended the human imagination, we could at least credit God with the urbanity and decency possessed by a cultivated English gentleman of the year 1700. He is often described as the first man to discover that God is a gentleman. The net result, then, of Deism and Rationalism was greatly to magnify and dignify the conception of God. Of course, the orthodox of that age regarded these writers as atheists. Most of them, however, including Voltaire, believed in the new Deistic God.

David Hume suggested that religion be studied in a realistic fashion by psychological methods as one would any other phase of human behavior. Hobbes, Spinoza and Astruc laid the foundations for biblical criticism. In this way orthodoxy was directly undermined at its very source and indirectly through the accumulation of scientific knowledge that challenged the scientific views embodied in the Bible. Matthew Tindal, Thomas Chubb and Henry St. John Bolingbroke drew a sharp contrast between "true" and "historic" Christianity. True Christianity was made up of the teachings of Jesus. Historic Christianity was the religion of the Catholics and Protestants of the seventeenth and eighteenth centuries, bearing only the most remote resemblance to the teachings of Jesus. These Deists accepted true Christianity as a valid religion according to the five basic tests, but rejected historic Christianity. Conyers Middleton, in his *Letter from Rome* (1729), pointed out the large number of pagan elements in historical Christianity. Gibbon explained the triumph of early Christianity as the result of secular historical causes rather than divine intervention. Middleton pointed out the unreliability of the Christian Fathers as historians. He showed that theirs was a credulous age, given to forgery and miracle-mongering, however high the motives of the faithful. Woolston, Middleton and Hume offered withering criticisms of the Christian belief in miracles. Hume's arguments have probably never been surpassed and may be regarded as the definite refutation of miracle-working and its services to the faithful.

There were also important social implications of these views. Shaftesbury suggested that the aesthetic basis of morality was sounder than the theological, rejected the orthodox notion that that was moral which led one safely into the New Jerusalem, and contended that the true test of the moral act was its contribution to the true and the beautiful. He was a Greek among the Puritans. Pope attacked the conventional Christian tendency to degrade man to a vile entity unworthy of study. The Deists upheld man as the supreme achievement of God's creative ingenuity and contended that to depreciate man was to insult God.

By thus rehabilitating man in his mundane setting, as he had not been since Greek days, the Deists aided the rise of the social sciences devoted to the study of man's nature and social relationships. Hitherto only theology had been regarded as significant because only man's soul was important. Inevitably with increasing interest in man as man came the desire to increase human happiness by improving social conditions and eliminating abuses and oppression. Thus secularism immediately suggested reforms in institutions, of no interest to a logical, orthodox, Christian, since he was chiefly concerned with salvation and, in any event, expected material things to pass away fairly soon. This interest in reform was well expressed by Helvetius, Condorcet and Bentham. The whole Rationalist philosophy was best summarized by Thomas Paine, organizer and expositor of high order, and noble crusader for truth and justice.

While this Rationalist movement began in England, it soon gained headway on the continent. Voltaire visited England in his earlier years and became the greatest exponent of the philosophy of freedom and enlightenment because of his versatility, courage and zeal. Diderot and the Encyclopedists first systematized, classified and rendered available to the reading public the essentials of the new learning and new Rationalist philosophy.

PUT EVOLUTION IN LIBRARIES

Thousands of public school libraries would place EVOLUTION in their reading rooms if we could furnish it without cost to them. But we have no capital with which to do this. So we put it up to you.

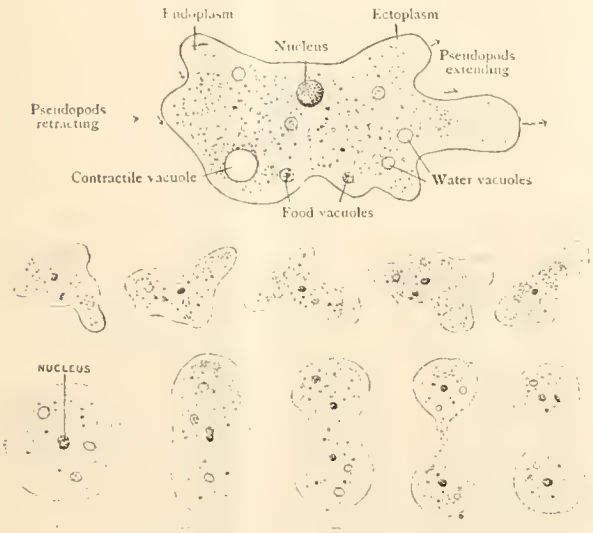
We'll place libraries on our mailing list for a year at fifty cents each. Every ten-spot puts EVOLUTION in twenty libraries.

The Amateur Scientist

A Monthly Feature *conducted by* Allan Strong Broms

AMOEBA, THE ONE-CELLED

Amoeba, one of the simplest of all animals, consists of a single, shapeless cell and is therefore microscopic in size. It should be looked for in the slimy coatings of leaves or stems submerged in stagnant water or on the slimy ooze of the bottom mud. Of course, a drop must be placed on the microscope slide and a cover glass placed gently over it. Then comes the real job of finding it, for its slowness of movement and lack of definite shape make it easy to miss. It is just a speck of clear, colorless jelly with a delicate, yet distinct outline. Within it appears a denser nucleus and occasionally a clear space, the contractile vacuole.



Amoeba; its structure, changes in shape, and method of reproduction by division.

If the object under suspicion is really an amoeba, it will presently betray itself by moving. One side will bulge into a projection called a pseudopod (false foot) or perhaps several of them. The pseudopod may be retracted, but often the rest of the body flows into it, resulting in locomotion, often in a consistent direction.

If a food particle happens in the way, a pseudopod extends to engulf it, usually with a little water. The space thus occupied is called a food vacuole and slowly disappears as the food is digested and absorbed. Waste matter is merely left behind as the amoeba flows away. The whole or any part of the body acts as stomach, while the surface in all its parts serves as mouth, lungs or excretory organ as occasion demands. It also seems to have a sense of touch, for it often avoids obstacles in its way, though this may be simply a chemical reaction of its jelly stuff.

When well fed, the amoeba may reproduce by simply dividing into two. Its middle becomes constricted, the nucleus divides and the constriction increases until the two halves part, each a complete amoeba. On the other hand, when subjected to drought or other unfavorable conditions, it forms a tough outer wall or cyst and remains dormant. When favorable conditions return, it ruptures the cyst, crawls out and renews its sluggish life. Our first ancestors must have resembled amoeba.

THE FALLING LEAVES

The leaves are turning to autumn tints and falling. That is the plant's way of saving the green stuff which gives it life. This green stuff, called chlorophyll, when exposed to sunlight stores away the energy of the light in the food materials which it builds up out of such substances as water, gases and soil material.

The cold of winter will stop the flow of the plant sap which carries the supply of materials and the food to and from the leaves. It is therefore an economy to withdraw the valuable chlorophyll from the exposed leaves before the frost begins to bite and kill. So it is withdrawn well into the body of the tree. The leaves thus lose their green and the reds and yellows now appear to glorify our landscapes.

When the withdrawal is completed, a thin layer of cork appears between the base of the leaf stem and the woody branch. This seals the wound that would otherwise be left when the leaf falls. Next spring, when the sap begins to flow once more, the new leaves bud out, green with the life-giving chlorophyll that has been saved, to do their work of food manufacture. Trees that use this method of shedding their leaves each year are called deciduous.

The evergreen trees have found a different solution by forming fat, needle shaped leaves which do not freeze so easily because they have less surface exposed. These do not fall off seasonally, but do their work on every day that is warm enough. As they usually live in a cold climate or at high elevations where spring comes late and winter early, each day of warmth and sunshine must be used, with no time for getting ready by growing new leaves.

Each method has been evolved by the survival of those plants that varied to fit these differing conditions of their surroundings. Those that did not fit, died out, while those that did fit, lived on and spread their kind.

"Faith," said the little boy, "is the power of believin' things you know aint so."

POPULAR ASTRONOMY LECTURES

New York City readers should attend the popular lectures given by the Amateur Astronomers Association at the American Museum of Natural History at 8:15 P. M. on the first and third Wednesdays of each month. The next, October 17th, is by Dr. H. T. Stetson of the Howard College Observatory on the subject, "What of Sun Spots."

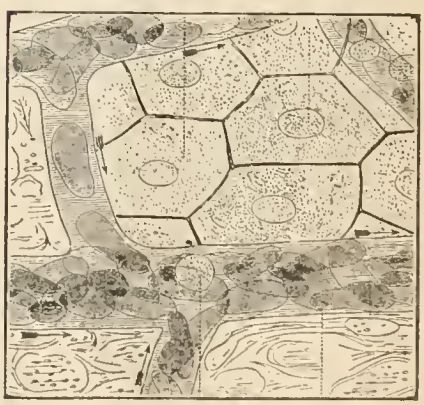
CIRCULATION OF THE BLOOD

The circulation of the blood can be seen in the thin web of a frog's foot. One with a pale web is best. The frog should be wrapped in a wet cloth, with one leg projecting, and then tied to a piece of shingle. Cut a hole in the shingle under the frog's foot. Tie threads around two of the toes and stretch the web, not too tightly, over the hole.

Now put the stretched web under a low power of the microscope. The large tubes are arteries which subdivide into a network of fine capillaries which then join into veins. The capillaries receive the blood from the arteries and pass it on to the veins. The pulsing streams of blood can be clearly seen, particularly in the arteries.

Under a high power, the large oval and slightly colored corpuscles are individually visible as they rush past. They are the boats of the blood stream carrying food matter and oxygen to the body tissues and carrying away the wastes. There are also other corpuscles, smaller, rounder and paler, fewer in numbers and moving slowly and unsteadily along the sides of the tubes, the so-called white corpuscles. One of their important jobs is to protect the body against disease microbes.

To examine the corpuscles more clearly, they must be stopped. The easiest way is to place a drop of the frog's blood on a microscope slide, with a thin cover glass over it, and examine it with a very high power. You can do the same thing with a drop of your own blood. The comparison is very interesting. When you have had a good look, unwrap the frog and let him go. He has contributed his share; give him a chance.



Fine blood vessels in frog's foot, showing oblong-red and round-white corpuscles. Arrows show direction of blood flow.

Funnymentals

"Every person who shall blaspheme against God, either of the persons of the Holy Trinity, the Christian religion, or the Holy Scriptures, shall be fined not more than one hundred dollars, and imprisoned in a jail not more than one year, and may also be bound to his good behavior."—Sec. 1323 General Statutes of Connecticut.

"Thou shalt not suffer a witch to live."—Exodus xxii, 18.

"If we could divide the human race into two distinct groups we might allow evolutionists to worship brutes as ancestors, but they insist on connecting all mankind with the jungle. We have a right to protect our family tree."—Wm. Jennings Bryan, in The Menace of Darwinism.

"If the brute theory leads to the abandonment of belief in a future life with its rewards and punishments, what stimulus to righteous living is offered in its place?" —Idem.

"The Great Pyramid stands as silent witness against materialistic evolution. It furnishes evidence that the first man instead of being a hairy primate just down out of the trees was the most perfect of all mere men, the most knowing and the most exalted; that the rare and special rapport with the supreme intelligence, which for certain gracious purposes was afterwards vouchsafed to the prophets, was Adam's normal condition; that the highest state of mind and heart, and such qualifications as best fitted him for his earthly life and destiny were realized in him as he came from the Creator's hand.

"No ugly, walking ape or ignorant savage, tenant of semi-tropic woods or musty caves, did God behold and bless when He set Adam in the world as the image of Himself and proclaimed him good."—Dr. Charles Spurgeon Knight, in The Defender, July, 1928.

"Books can bite; hooks have poisonous fangs, and American libraries may not all be known as snake museums; but the snake of infidelity and atheism is abundant in most of them."—W. B. Riley in Christian Fundamentalist, Sept., 1928.

"The first proposition that the sun is the center and does not revolve around the earth is foolish, absurd, false in theology and heretical because expressly contrary to Holy Scripture. The second proposition that the earth is not the center but revolves about the sun is absurd, foolish, false in philosophy and from a theological standpoint at least, opposed to true faith." Decision regarding Galileo by Holy Inquisition at Rome.

Send us quotations for "Funnymentals" column. Be exact. Give authority.

IF YOU KNOW A STREET SPEAKER

do him a favor by calling his attention to EVOLUTION. A short talk will sell a lot of copies at any meeting. We furnish them at 20 for a dollar.

FROM SCHOOLBOY SCIENCE PAPERS

The earth makes a resolution every twenty-four hours.

The difference between air and water is that air can be made wetter and water can not.

We are now masters of steam and eccentricity.

Things that are equal to each other are equal to anything else.

Gravity is chiefly noticeable in the autumn, when the apples are falling from the trees.

The axis of the earth is an imaginary line on which the earth takes its daily routine.

A parallel straight line is one which if produced to meet itself does not meet.

Electricity and lightning are of the same nature, the only difference being that lightning is often several miles long while electricity is only a few inches.

—Boston Transcript.

Noah On Evolution

By Pauline H. Dederer

On top of Mt. Ararat, old uncle Noah sat
Reading the news in the Daily Earth.
Quoth he, "Mrs. Noah, I'd just like to show a
Fool editor here what I think he is worth!

"In the dread name of science, he bids us defiance,
And calmly declares us to be but a myth
Of the old nature fakers, and history makers,
In order to give their books piquance and pith.

"Man of ape is the brother, or cousin, or other
Near relative, he says, of nobler estate.
Who lost his long tail, and grew brains to such scale
That he's now mighty proud of the shape of his pate."

Said old uncle Noah, "I think they might go a
Long way ere they found such ancestors as we,
And why they should spurn us, so meanly down-turn us,
Is more than my old eyes can possibly see.

"My grandfather Adam, the boys and the madam,
I always supposed were the first of our race;
But if 'tis a fable about Cain and Abel—
The Tower of Babel—there's nary such place.

"Do you think we were dreaming when we saw the streaming
Of flesh, fish, and fowl through the doors of our camp?
And don't you remember, one day in September,
My love, you declared that the place was TOO damp?

"This cult of the monk is just nothing but bunk—
An ape for a grand-dad—the big hairy brute!
What that man doesn't know I can very soon show,
And pull up his family tree trunk, branch and root.

"To his office we'll hump us, stir up such a rumpus
He'll make quick retracting, and grant us redress,
And I'll wager a dime that in double quick time
You'll see a fine write-up of us in the press."

From Our Readers

"We are not interested in your EVOLUTION and infidelity nor your 'ancestors'. Send it to those who descended from the monkey."—J. D. Hammond, Beebe, Ark.

"Please rush us six copies of EVOLUTION."—Warner Drug Co., Hoxie, Ark.

"Read your Bible first."—Arrow Variety Store, Morrilton, Ark.

"Send me some order blanks and I will get all the subscriptions I can before election as I would hate to see the fundamentalists pass their anti-evolution bill. Got these four subs in a few minutes, in fact made four sales out of five calls."—C. D. Foreman, Arkansas.

"Men, your fight has just begun. May your courage (and cash) endure. Kill the Beast!"—George Wolpert, New York.

"I find EVOLUTION a bright, snappy sheet.—just the thing for conversion of the heathen."—C. H. Dresser, Connecticut.

"The other $1 is for the benighted in Arkansas province. Use it to send EVOLUTION to twenty in the twilight zone, or should I have said land of the midnight sun."—Marshall Dunn, New York.

THE CHOICE

The Funnymental preacher
Denies his monkey blood;
Wants his children's teacher
To teach they sprang from mud!

Why should he get the dumps
About his monkey blood;
Isn't the monkey many jumps
Ahead of a lump of mud?

—Bob Lyle.

"Send me 30 copies. Of all that I have received, none remain in my possession, owing to their seizure by interested friends." Hymie Karshofsky, Tennessee.

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FOR ARKANSAS EDUCATION

Since the people of Arkansas have to vote on the question of evolution November 6th, many who never bothered with such subjects before want to know what it is all about. A seed planted in this receptive ground should bear fruit. We'll plant twenty copies of EVOLUTION among Arkansas voters for every dollar that you remit "for Arkansas Education."

The following contributions have already been received: Louise W. Kneeland ,$5; Ellen R. and T. M. Nagle, $10; Frank Masek, $4; A. A. Heller, $4; Misses C. Z. and F. M. Hartman, $5; Rudolph Eickemeyer, $10; Chas. W. Townsend, $5; M. Zametkin, $10; Gustav Schmeman, $1.25; M. Dunn, $1; G. M. Morris, $2; J. U. Norris, $1; Geo. W. Van Pelt, $1; Mrs. J. O. Beebe, $5; C. H. Dresser, $3; Chas. Schuchert, $10; A Friend, $20; C. N. Clauder, $1; Ernest Lilien, $1; H. L. Gonor, $2; Czechoslovak Rationalist Federation, $10; S. W. Narregang, $2; Emil Falk. $2; Joseph Wittek, $5; B. A. Levett, $10; Chas. Fuchs, $5; Junius Henderson, $5; G. J. Johnson, $5; Herold Wuerfel, $1; Mrs. Earl Chichester, $1; H. G. Wyatt, $1; Geo. H. Childs, $1; Julius Janowitz, $10; Mrs. F. M. Lachmund, 75c; A. Marsh, $5; E. L. Sumner, $1.

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AIMEE IN ENGLAND

The Reverend Aimee Semple McPherson is now holding forth in Albert Hall in London. In view of the report that 150 cities in England have asked for her services we reprint for the consolation of our British friends the following from E. W. Howe's Monthly:

THE REVEREND
AIMEE McPHERSON.

Every time Aimee McPherson advertises a religious meeting, and attracts a considerable audience, I blush for the race to which I belong;

For all those who attend such meetings in sober earnestness, and accept what she says as important, are pitiful evidences of degeneration;

I wonder that statistics of such attendance are not collected widely, printed as matters of alarm, and something done to help save these poor wretches, as we now endeavor to help other unfortunates.

The McPherson woman has no intelligence, no message, no morals, and no honest way of making a living. The fact that certain persons go to such a creature for help is serious indictment of the human race.

"IF YOU do nothing to help make the world better, you help to make it worse. If you do nothing to overthrow tyranny, you assist in maintaining it. If you fail to fight for freedom, you aid in enslaving your friends. If you are not a propagandist for truth, you are a supporter of error."—Queen Silver.

HEIR OF ALL THE AGES, by N. K. McKechnie, Bobbs-Merrill Co. $3.50.

Here is a story told in reverse, the beginning last and the end first. The end is Mr. Hamilton Smith, a strap-hanger like you and me, who clerks downtown and chews gum. He is not an adventurous soul at all, but he certainly did have ancestors who got their thrills. He is not a bit proud of them, what he knows of them, but he certainly ought.

There was Wat the Wagoner who loses a night's sleep only four generations ago; then Hubert the Smith who marches to the King in the Revolt of the Peasants back in the fourteenth century. Still further back, Oswulf the Briton waif finds a kind father among the new Saxon masters of England. That was forty-five generations ago; the next is seventy-five. Conan, the Druid boy, joins the blood-feud of his Briton master to win a sweetheart and fame. Long before that, Ith the husbandman narrowly escapes death and deification that the village crops may grow. Skipping another six thousand years, we see the uncouth Hu, migrant, woo his fisher-maiden of the lake-dwellings. Long, long before that, Firestick, he of the fire magic, weathers the great Mediterranean flood when the Atlantic waters break through the Gibraltar land-bridge between Europe and Africa. An earlier ancestor was Twice-Born, lucky, though he and his kin must needs follow the great reindeer herd food-supply across the cold wastes of the Ice Age. And so on, plunging back through the hundreds of thousands and even millions of years; Fuzzy-Wuz, the lusty voiced ape-man who escapes Sabre-Tooth, the tiger; then Outcast, the man-ape, who dies a heroic death; Chat-Chat, monkey-like dweller in a tree-top paradise; little Possie, first of the mammals, who watches the mighty dinosaurs do battle; Flip, the lizard, who loses his tail, but grows a new one; and so on, back through ancestral flesh, fish and worm. Such are the progenitors of Mr. Hamilton Smith, heir of all the ages.

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A. S. B.

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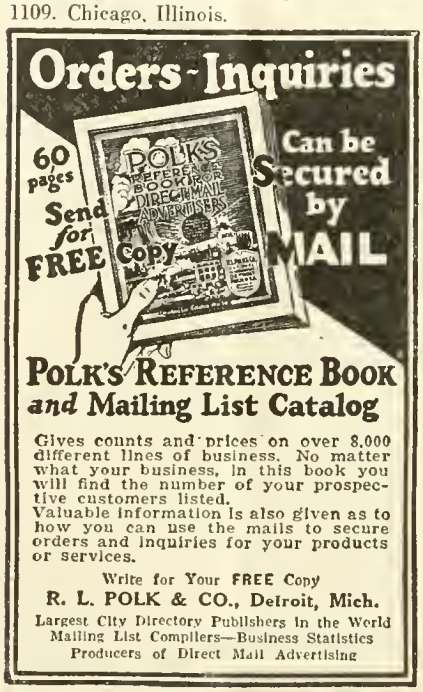
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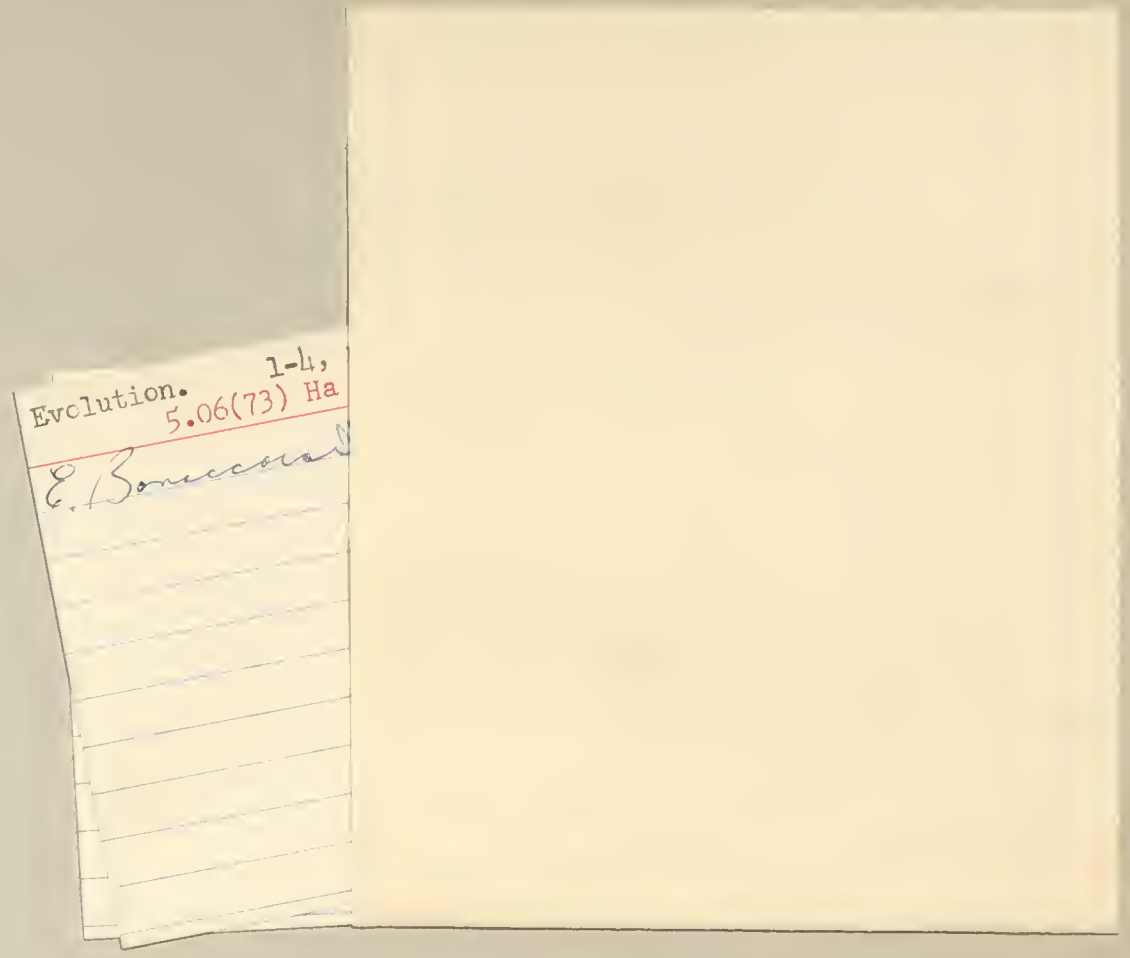

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